JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

February 27, 2009

Mr. John Niemela, Director
County Road Association of Michigan
P.O. Box 12067
Lansing, Michigan 48901-2067

Mr. David Worthams
Assistant Director – State Affairs
Michigan Municipal League
320 N. Washington Square, Suite 110
Lansing, Michigan 48933-1288

Dear Mr. Niemela and Mr. Worthams:

Draft – Updated HMA Mix Selection Guidelines

Enclosed for distribution to your members is a copy of the Draft – Updated HMA Mix Selection Guidelines. These guidelines are in process of being updated to allow Superpave mixes to be used on Local Agency projects.

The draft of these guidelines was developed in response to inquiries made by several county road engineers as well as private consultants. We are also planning to review these guidelines with the CRAM Engineering Committee at the Committee's March meetings. To assist those who have inquired, we have placed a copy of the draft of this document on the MDOT Local Agency Program website.

Following approval by the CRAM Engineering Committee, MDOT will post the final documents online on the Local Agency Program website.

If you or any of your members have questions regarding this policy, please contact Mark Harbison at (517) 335-2744.

Sincerely,

Rudolph S. Cadena, PE
Local Agency Programs Engineer
Local Agency Programs

Enclosure

cc: Bruce Kadzban, LAP
Mark Harrison, LAP
Mark Harbison, LAP

Local Agency Programs
Hot Mix Asphalt (HMA) Selection Guidelines

Rev.02 /23/09

The following guidelines have been developed at the request of Local Agency Engineers for use on Local Agency projects. These guidelines have been reviewed and approved by the County Road Association of Michigan (CRAM) Engineering Committee. Previous experience and performance shall permit variations from these guidelines.

A. HMA Mixture Type and Binder selection

Selection is based on present day two-way commercial ADT. The commercial ADT ranges for each of the mixture types have taken into account an assumed future traffic growth rate.

Com. ADT.	Com. ADT 0-300	Com. ADT 301-700	Com. ADT 701-1000	Com. ADT 1001-3400	Com. ADT 3401- 9999
Mixture Type					
Top	13A, 36A, or LVSP	4C 5E1	5E3, or 4E3	5E10, or 4E10	5E30, or 5E10
Leveling	13A or LVSP	3C 4E1	4E3	4E10	4E30
Base	13A	2C	3E3	3E10	3E30
Binder Grades by Region					
Superior	PG 58-34	PG 58-34	PG 58-34	PG 58-34	
Metro	PG 58-22	PG 64-22	PG 64-22	PG 64-22	PG 70-22P
All Other	PG 58-28	PG64-28	PG-64-28	PG64-28	PG70-28P

Note: The recommended PG binder grades for mixtures used as a base course is PG58-22 for all regions except the Superior Region, which is recommended to have PG 58-28. **The base course is defined as all layers below 4 inches of the surface. For mixture layers which fall within the 4 inch threshold, the following rule applies: If less than 25% of a mixture layer is within 4 inches of the surface, the mixture layer should be considered to be a base course.**

Note: The **Special Provision for Marshall Hot Mix Asphalt Mixtures** specifies design air voids of 4% for 13A and 36A. If the designer wishes to reduce the target air voids on projects that call for a 13A and 36A to 3.0%, a note needs to be added to the plans near the HMA

Application Table stating that the air voids have been changed to 3.0% for that particular project.

Note: The mixture type in each traffic category listed in the above table is specifically designed to perform under its respective Commercial ADT. Selecting a mixture type that is specifically designed for a Commercial ADT higher than the project being designed may adversely affect performance.

Note: One course overlays are considered preservation projects with a design life less than 20 years. On these projects the prevention of cold temperature related thermal cracking is not a concern. Therefore decrease the cold temperature number of the PG binder by one grade to help reduce costs.

Example: For a one course overlay in the Superior Region on a composite project, the recommended PG binder would be a PG58-28 instead of a PG58-34.

Note: The standard pay item **High Stress Hot Mix Asphalt Mixture** is used for pavements in traffic areas that are more susceptible to rutting early in the pavement life, such as at signalized intersections and other areas of stop/start traffic.. The difference between the High Stress HMA Mixture and the typical HMA pay item is the Performance Graded binder. The increase in the high temperature number results in an asphalt binder with improved high temperature stiffness or rutting resistance for both the leveling and top course.

Example: For a high stress application for a mixture type 5E3 placed in an intersection the recommended binder grade would be a PG70-28P instead of a PG64-28.

Following are the recommend guides for the proper application of the Special Provision for High Stress Hot Mix Asphalt Mixture.

a. Use this pay item 1000 feet on either side of the center of signalized intersections and other areas where stop/start traffic occurs on the mainline (for quantity calculations use 1100 feet).

b. There are cases where the signalized intersections are spaced 1 mile or less over the entire length of the project. When this occurs, specify the High Stress HMA Mixture pay item for the entire length.

c. All HMA approaches that are adjacent to the High Stress HMA Mixture areas should be specified using this pay item.

B. Application Rates

HMA application rates shown in the table below are the recommended minimum and maximum rates for each of the specific mixtures. Pavement designs requiring a HMA greater than the recommended maximum will require multiple lifts of the leveling and/or base mixes.

Mixture Type	Marshall Mixture					Superpave Mixture			
	36A	13A	2C	3C	4C	LVSP	3E_	4E_	5E_
Min. #/syd	110	165	350	220	165	165 Top or Leveling	330	220	165
Max. #/syd	165	275	500	330	275	220 Top 250 Leveling	410	275	220

Note: Application rate of 110 #/syd per inch of HMA thickness

Note: When shoulders of 8 ft. width or greater are being paved as a separate operation on a project, the following note should be added to the plans near the HMA Application Table; "

> For shoulders only, the mix design and/or JMF target value for Air Voids are to be adjusted to 2.5 percent.

If it is not known whether the shoulders will be placed as a separate paving operation, the note should be added

Aggregate Wear Index – Applicable to all projects

Aggregate Wear Index (AWI) is required for all aggregates used in HMA top course mixtures. The following table identifies the required minimum AWI, based on the present average daily traffic (vehicular and commercial) per lane (ADT/Lane):

ADT/Lane	**Minimum AWI**
<100	None
100 - 2000	220
>2000	260

Alternative Mixes

These guidelines provide for the selection of Hot Mixed Asphalt (HMA) and application rates utilizing the Superpave mix design system along with the Marshall mix design system. The substitution of another HMA mixture type other than the recommended mixture is acceptable if it has demonstrated to perform under similar traffic conditions. If a local agency desires to use an HMA mixture or grade of binder other than what is recommended, the local agency must request the change in writing, in a letter to the MDOT Local Agency Program (LAP) staff engineer who is responsible for delivering the project through the MDOT system. At minimum, the letter should include the following:

- request to use an alternate mix design,
- the proposed alternate mix design
- justifications and supporting documentations for the request, and
- a statement that the local agency accepts responsibility for the outcome of the performance of the mix design that is used in lieu of the recommended mixture.